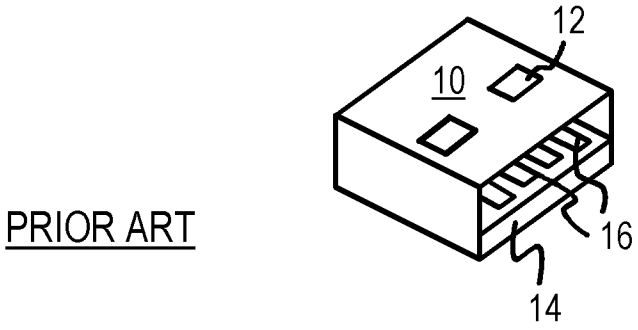
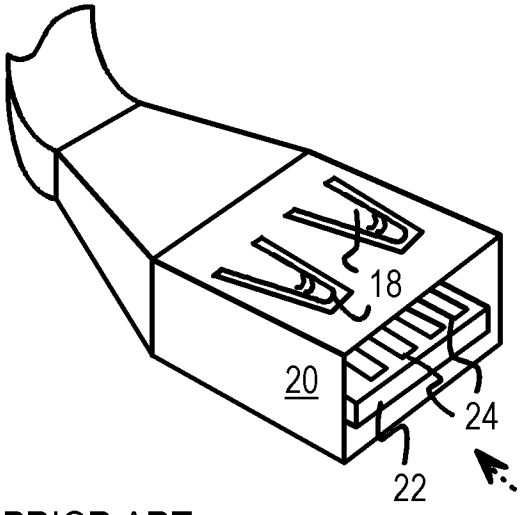


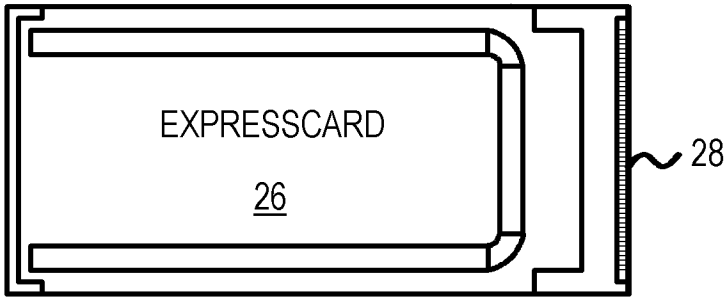

PRIOR ART

FIG. 1A



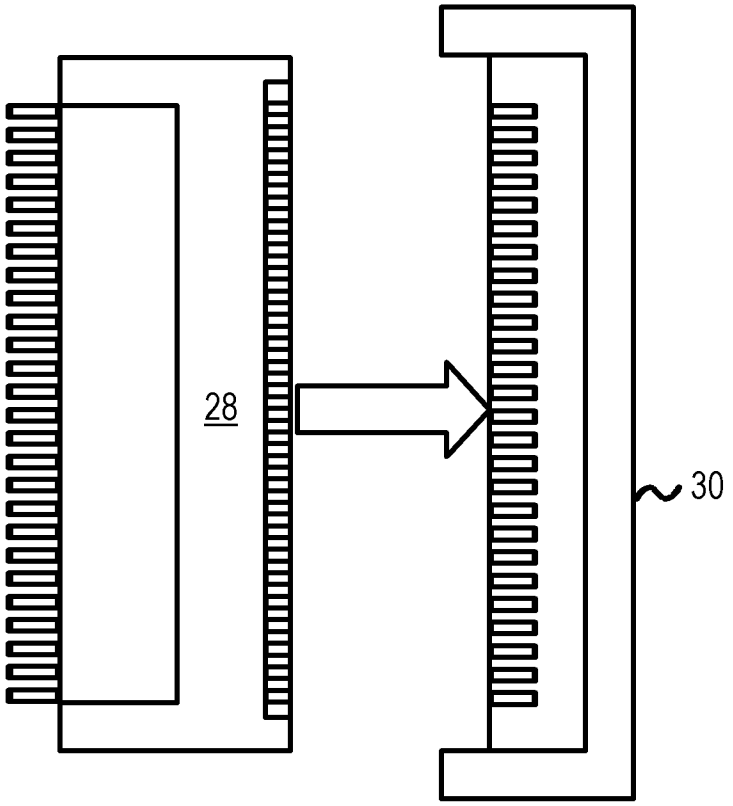

PRIOR ART

FIG. 1B




PRIOR ART

FIG. 2A




PRIOR ART

FIG. 2B

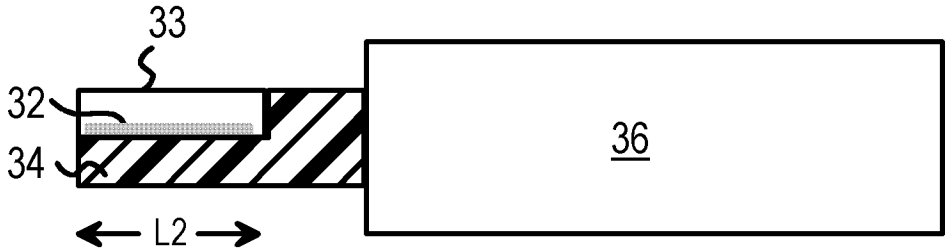



FIG. 3A PRIOR ART

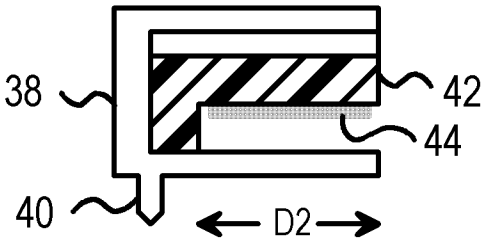
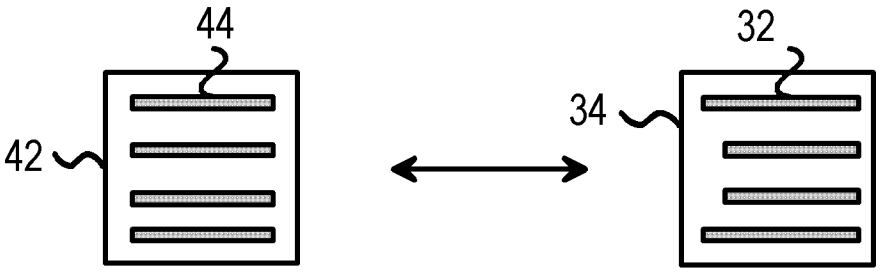



FIG. 3B PRIOR ART




PRIOR ART

FIG. 3C

FIG. 3D

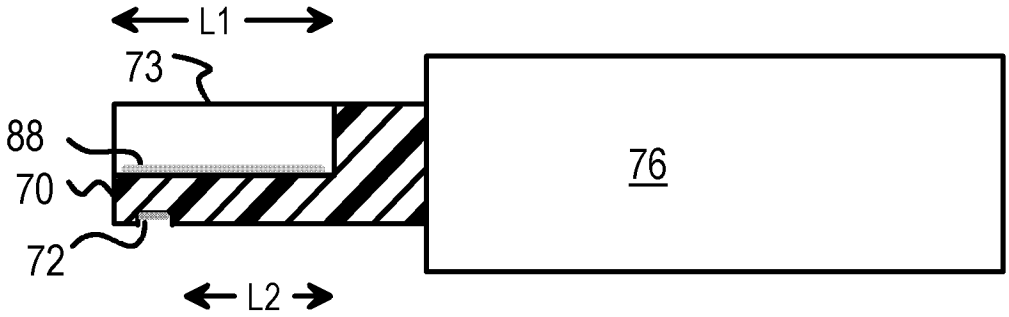



FIG. 4A

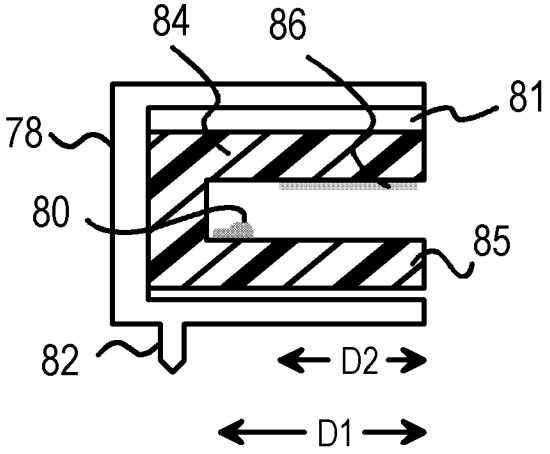



FIG. 4B

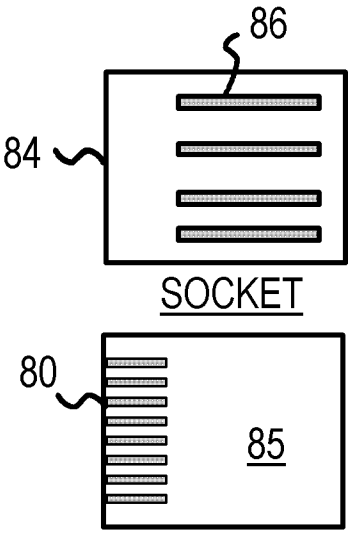



FIG. 4C

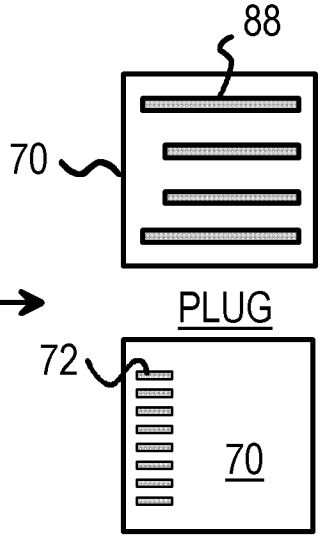



FIG. 4D

TOP

BOTTOM

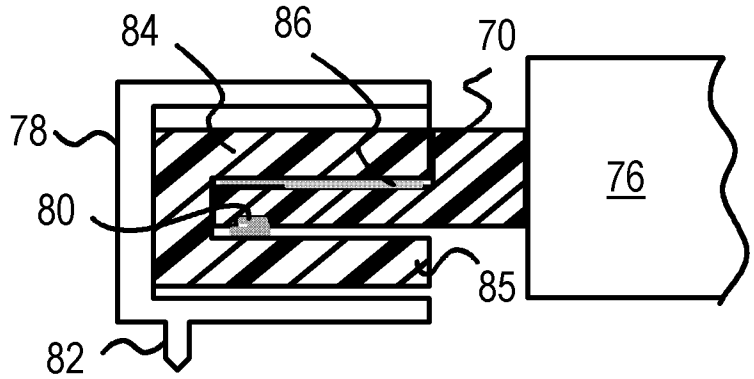



FIG. 4E

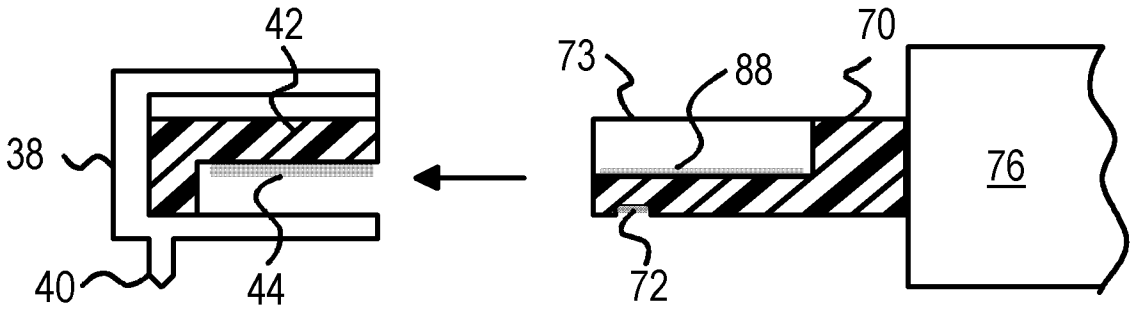



FIG. 4F

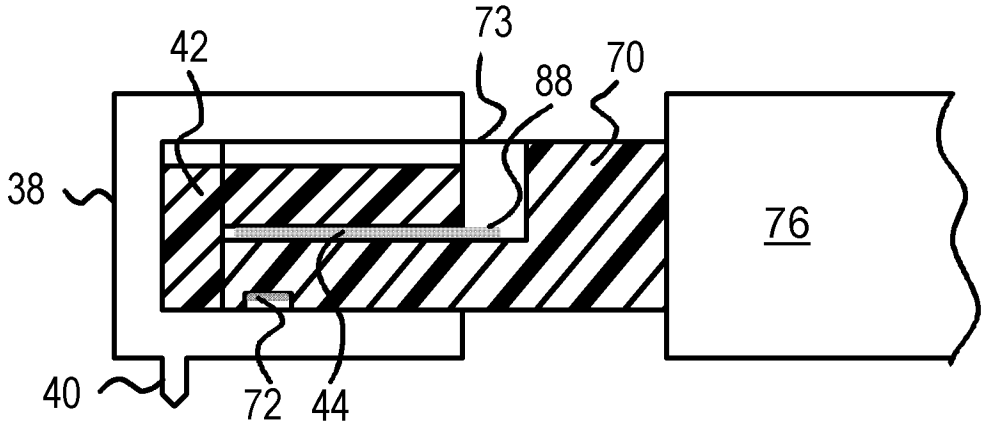



FIG. 4G

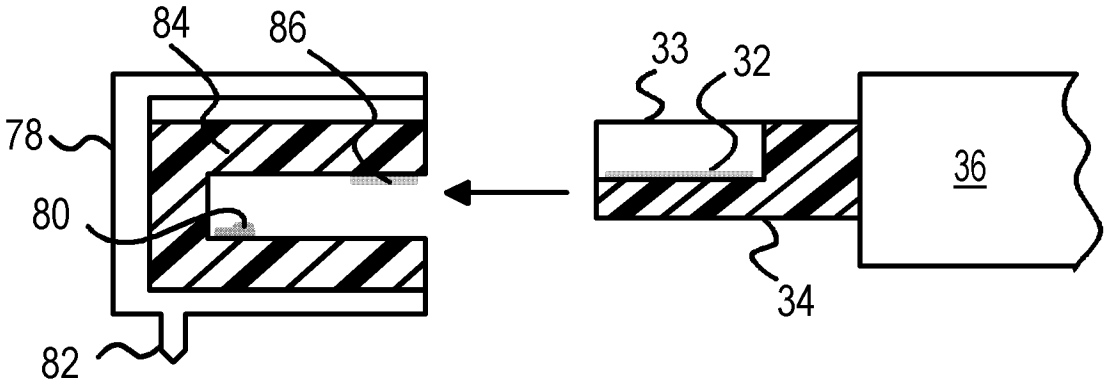



FIG. 4H

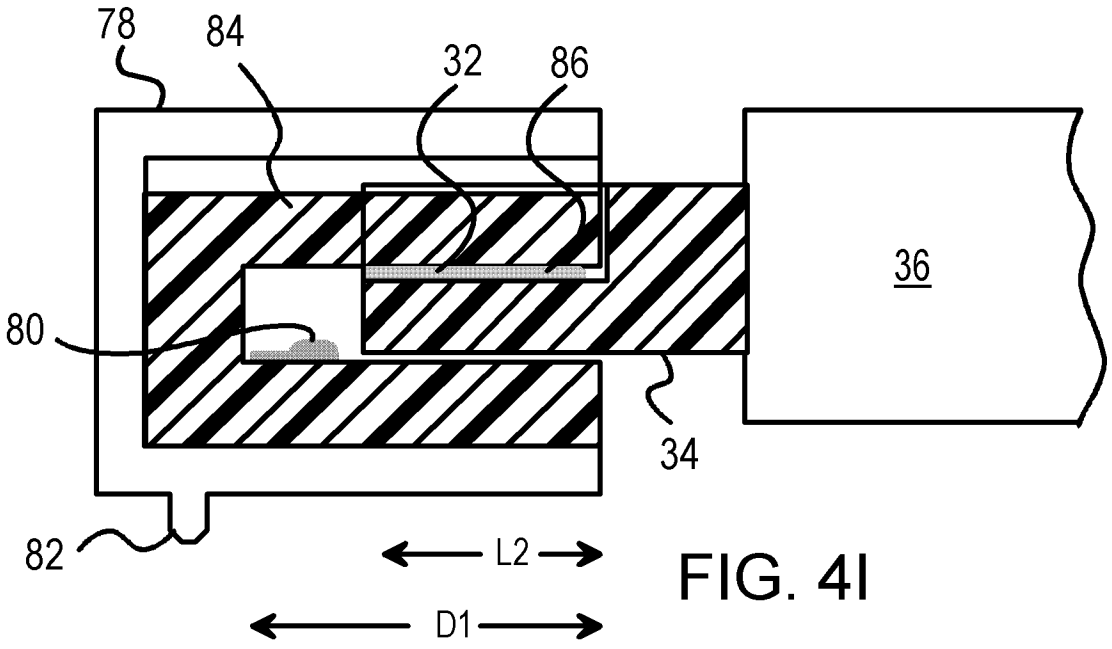



FIG. 4I

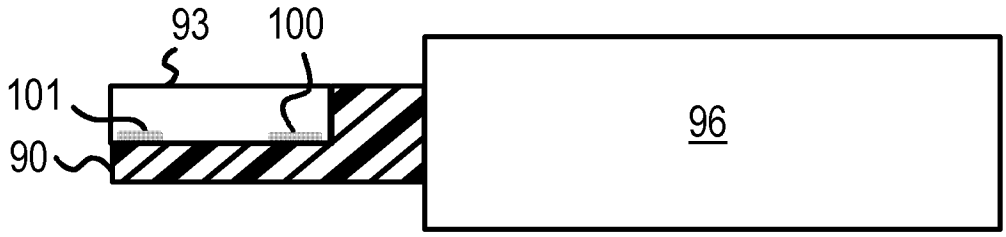



FIG. 5A

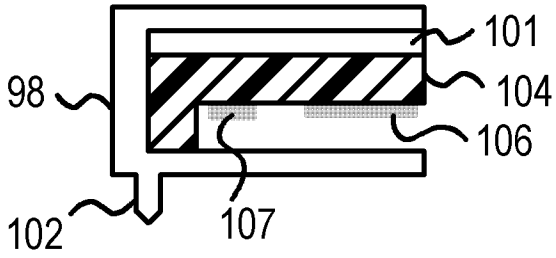



FIG. 5B

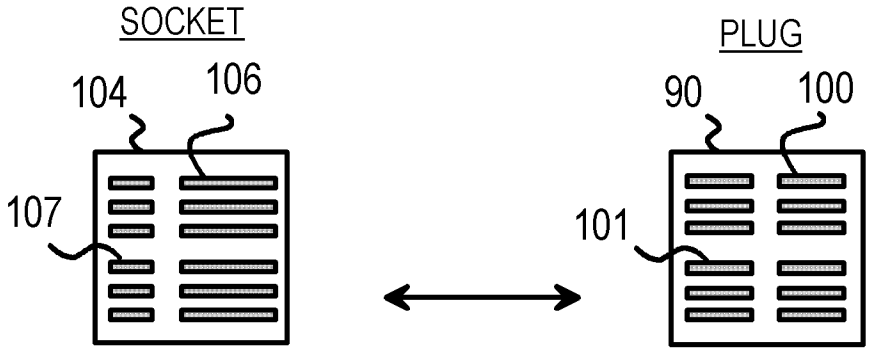



FIG. 5C

FIG. 5D

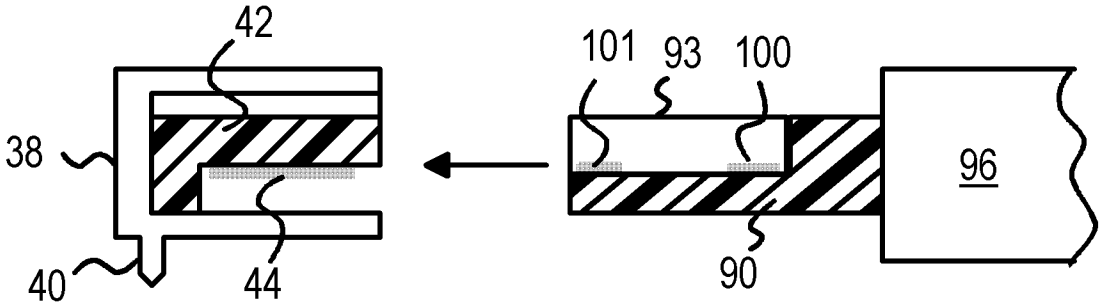



FIG. 5E

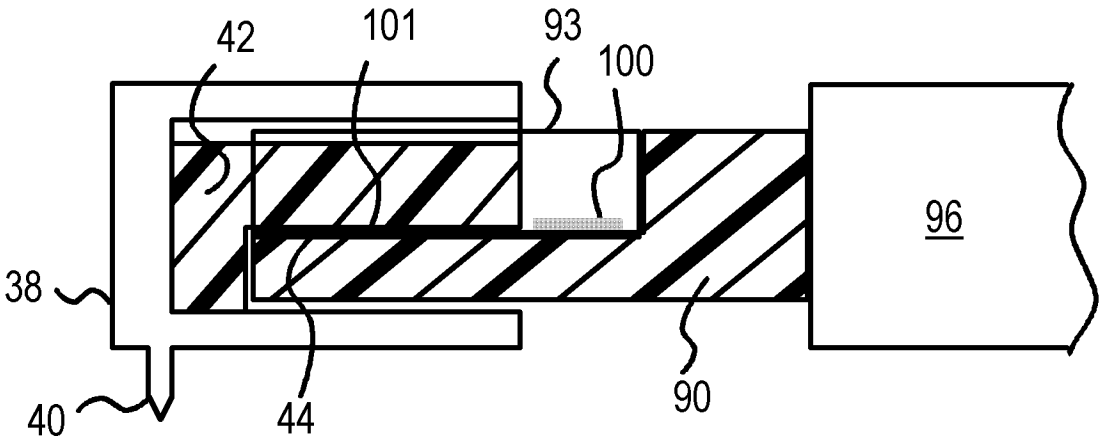



FIG. 5F

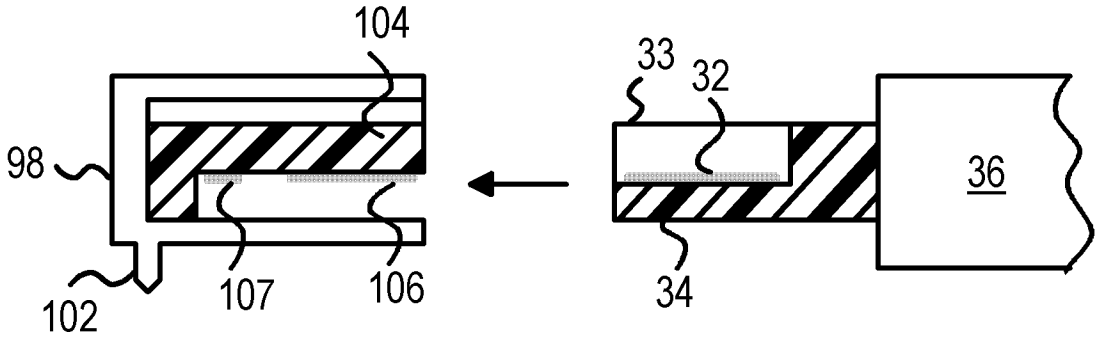



FIG. 5G

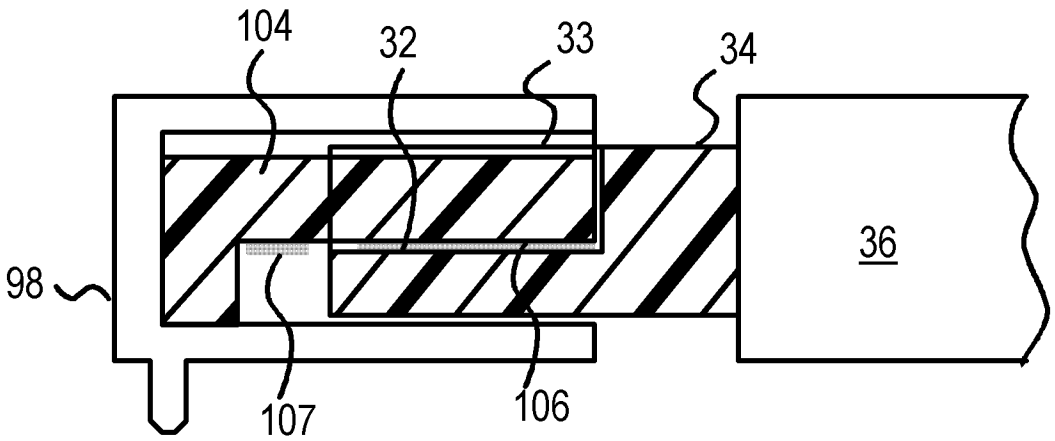



FIG. 5H

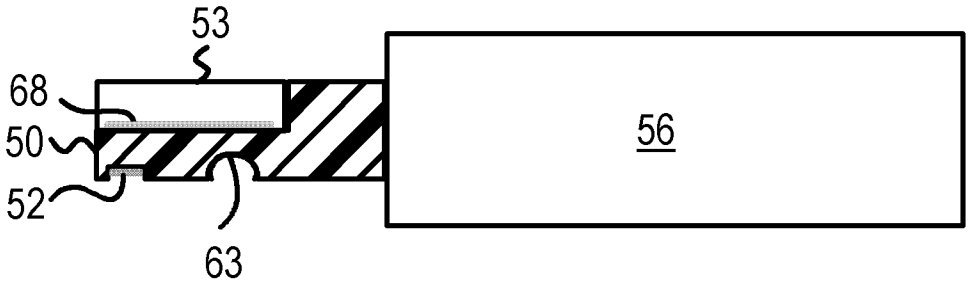



FIG. 6A

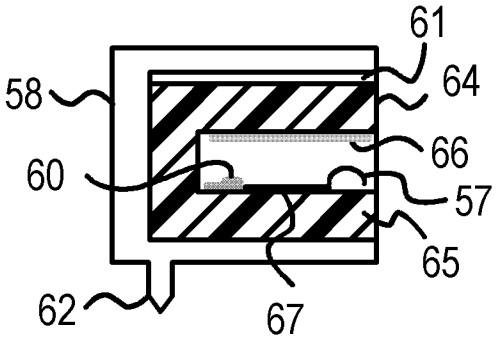



FIG. 6B

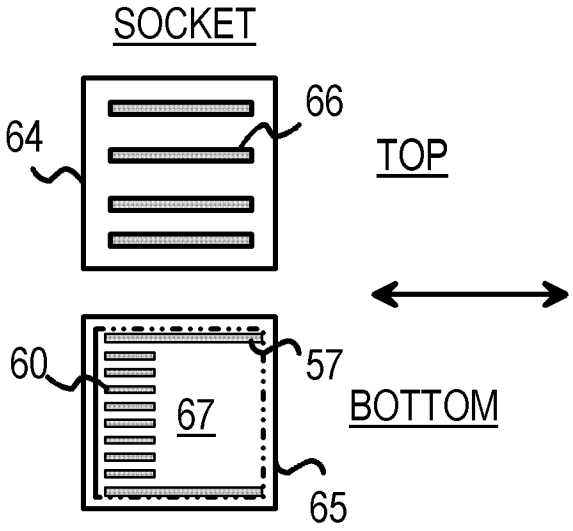



FIG. 6C

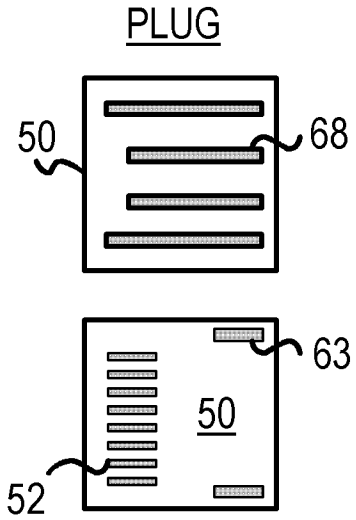



FIG. 6D

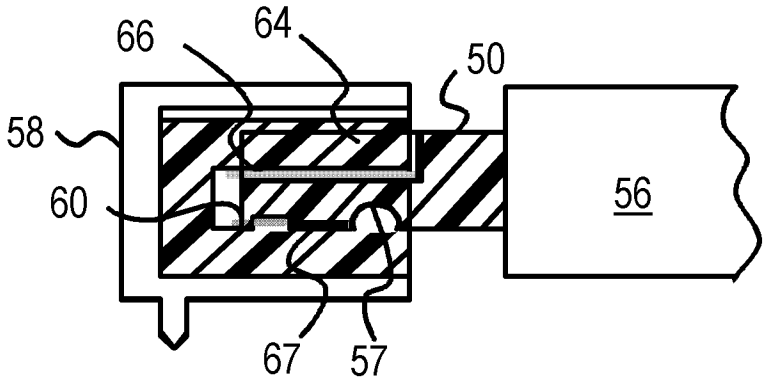



FIG. 6E

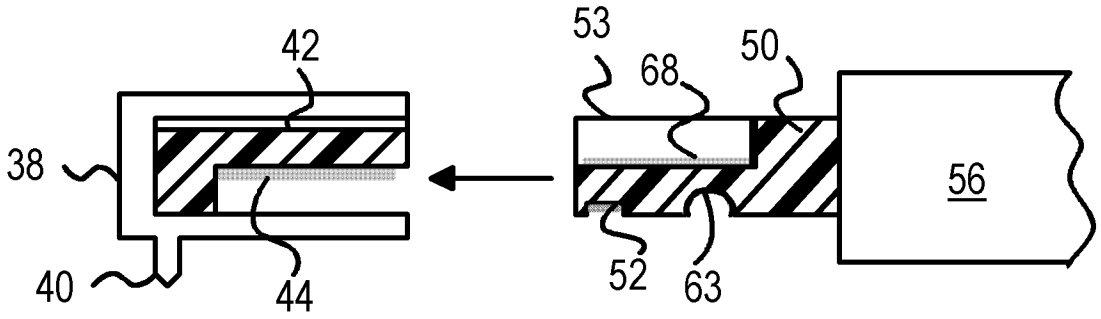



FIG. 6F

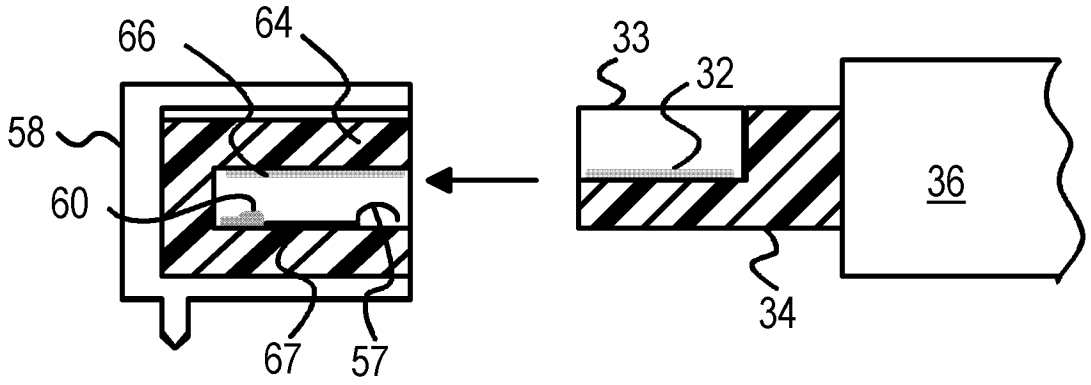



FIG. 6G

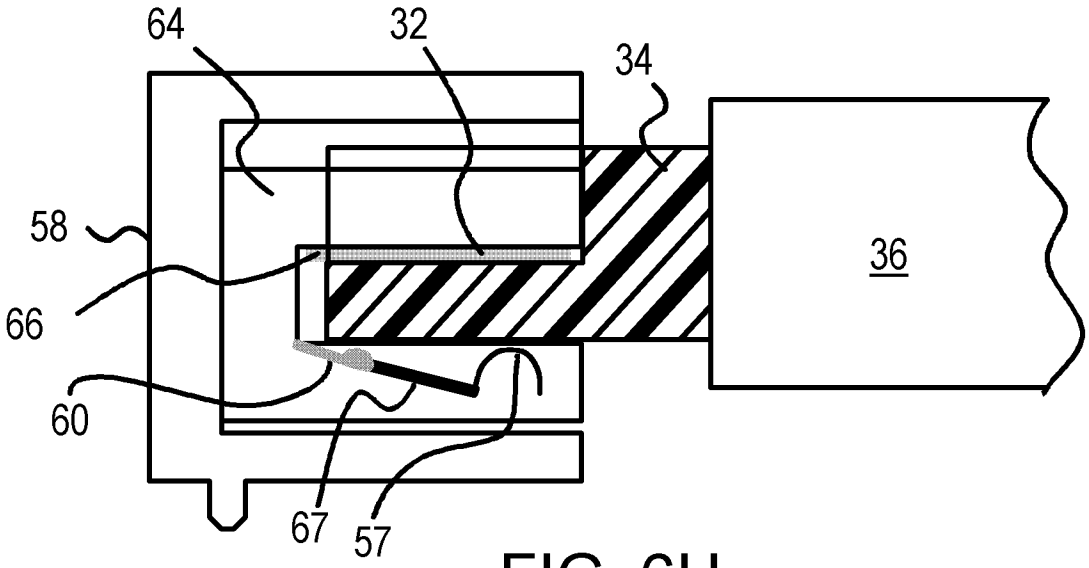



FIG. 6H

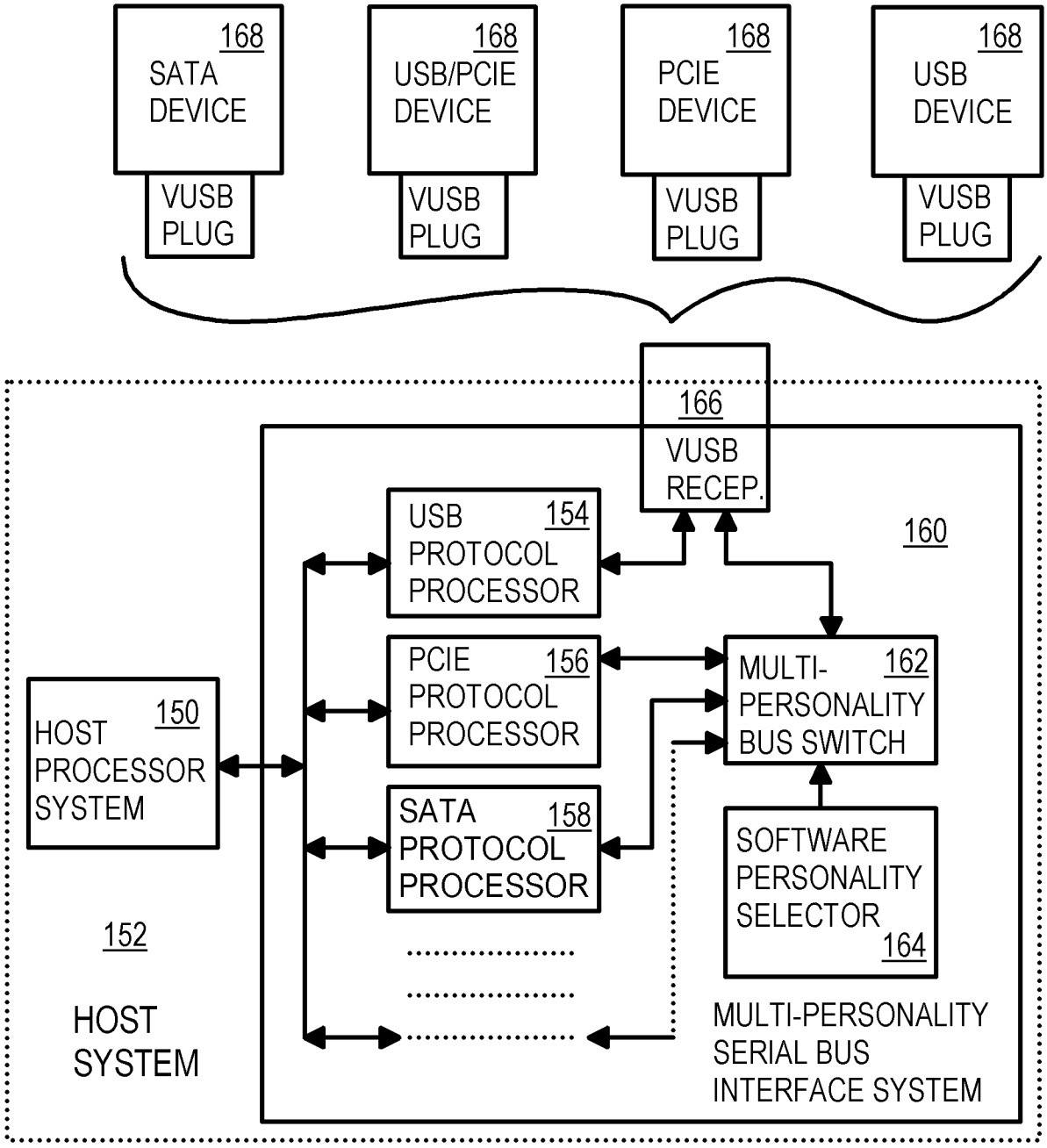

168
SATA DEVICE
VUSB PLUG
168
USB/PCIE DEVICE
VUSB PLUG
168
PCIE DEVICE
VUSB PLUG
168
USB DEVICE
VUSB PLUG
166
VUSB RECEP.
160
USB 154
PROTOCOL PROCESSOR
PCIE 156
PROTOCOL PROCESSOR
SATA 158
PROTOCOL PROCESSOR
MULTI- 162
PERSONALITY BUS SWITCH
SOFTWARE PERSONALITY SELECTOR 164
HOST 150
PROCESSOR SYSTEM
152
HOST SYSTEM
MULTI-PERSONALITY SERIAL BUS INTERFACE SYSTEM

FIG. 7A

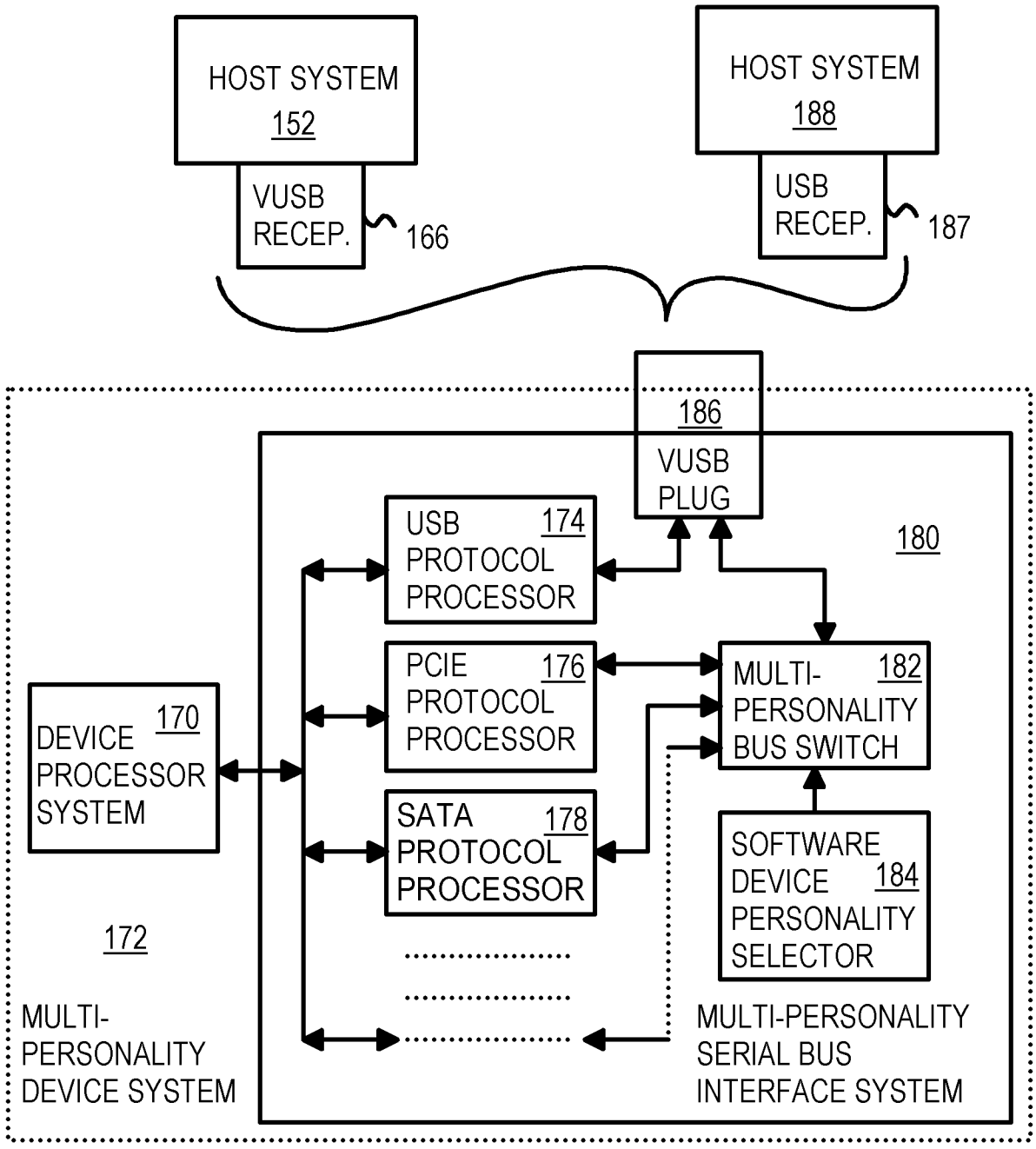

HOST SYSTEM
152
VUSB
RECEP.
166
HOST SYSTEM
188
USB
RECEP.
187
186
VUSB
PLUG
180
USB
PROTOCOL
PROCESSOR
174
PCIE
PROTOCOL
PROCESSOR
176
SATA
PROTOCOL
PROCESSOR
178
MULTI-
PERSONALITY
BUS SWITCH
182
SOFTWARE
DEVICE
PERSONALITY
SELECTOR
184
DEVICE
PROCESSOR
SYSTEM
170
172
MULTI-
PERSONALITY
DEVICE SYSTEM
MULTI-PERSONALITY
SERIAL BUS
INTERFACE SYSTEM

FIG. 7B

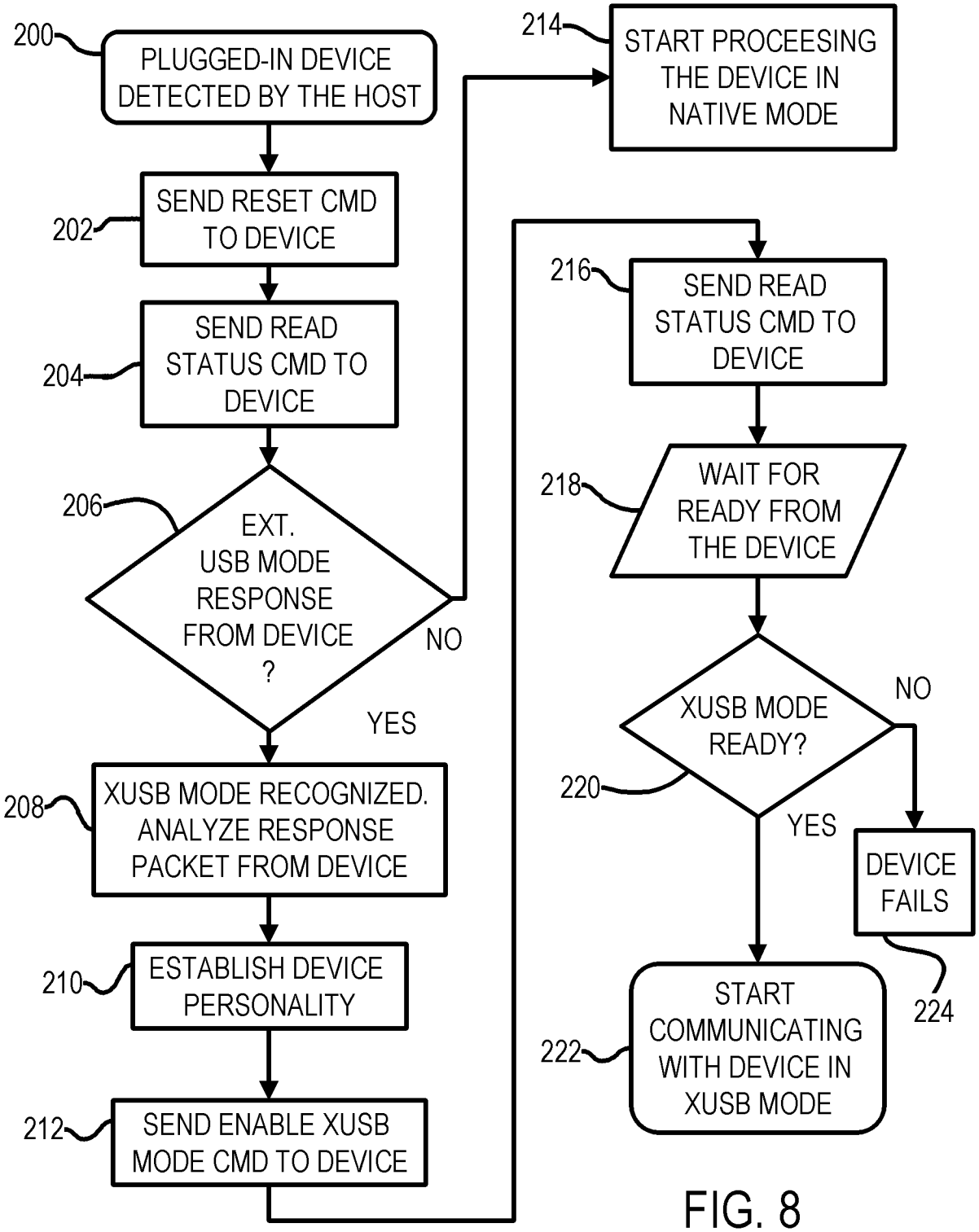
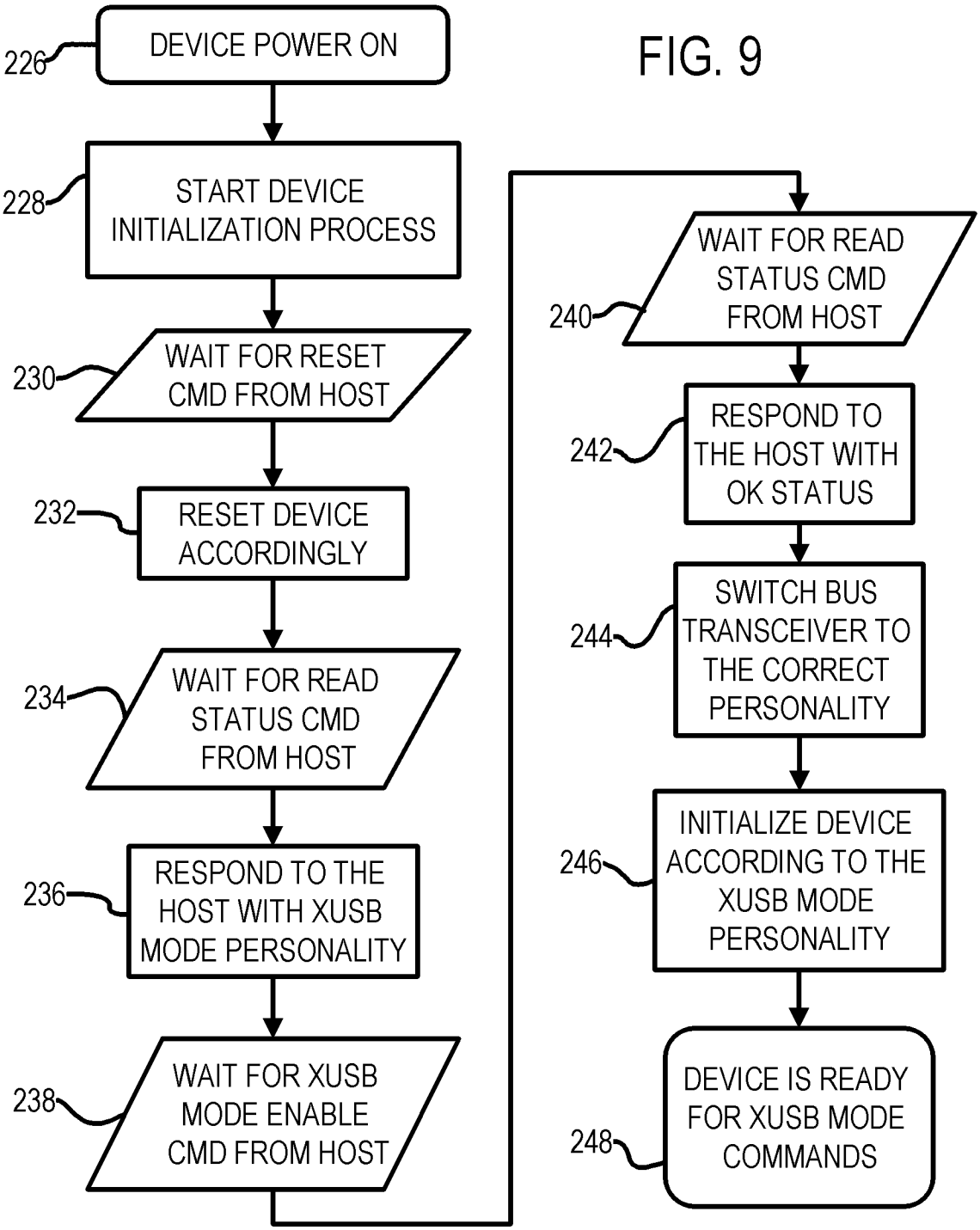

200
PLUGGED-IN DEVICE DETECTED BY THE HOST
202
SEND RESET CMD TO DEVICE
204
SEND READ STATUS CMD TO DEVICE
206
EXT. USB MODE RESPONSE FROM DEVICE ?
NO
YES
208
XUSB MODE RECOGNIZED. ANALYZE RESPONSE PACKET FROM DEVICE
210
ESTABLISH DEVICE PERSONALITY
212
SEND ENABLE XUSB MODE CMD TO DEVICE
214
START PROCEESING THE DEVICE IN NATIVE MODE
216
SEND READ STATUS CMD TO DEVICE
218
WAIT FOR READY FROM THE DEVICE
220
XUSB MODE READY?
NO
YES
DEVICE FAILS
224
222
START COMMUNICATING WITH DEVICE IN XUSB MODE

FIG. 8

FIG. 9


226
DEVICE POWER ON
228
START DEVICE INITIALIZATION PROCESS
230
WAIT FOR RESET CMD FROM HOST
232
RESET DEVICE ACCORDINGLY
234
WAIT FOR READ STATUS CMD FROM HOST
236
RESPOND TO THE HOST WITH XUSB MODE PERSONALITY
238
WAIT FOR XUSB MODE ENABLE CMD FROM HOST
240
WAIT FOR READ STATUS CMD FROM HOST
242
RESPOND TO THE HOST WITH OK STATUS
244
SWITCH BUS TRANSCEIVER TO THE CORRECT PERSONALITY
246
INITIALIZE DEVICE ACCORDING TO THE XUSB MODE PERSONALITY
248
DEVICE IS READY FOR XUSB MODE COMMANDS

| SIDE | PIN-OUT | USB | PCI-EXPRESS | S-ATA | IEEE 1394 |
|---|---|---|---|---|---|
| A | 1 | 5V | 5V | 5V | 5V |
| A | 2 | D- | D- | D- | D- |
| A | 3 | D+ | D+ | D+ | D+ |
| A | 4 | GND | GND | GND | GND |
| B | 1 | | 3.3V | 3.3V | 3.3V |
| B | 2 | | 1.5V | N/C | N/C |
| B | 3 | | PETn | T- | TPB* |
| B | 4 | | PETp | T+ | TPB |
| B | 5 | | GND | GND | GND |
| B | 6 | | PERn | R- | TPA* |
| B | 7 | | PERp | R+ | TPA |
| B | 8 | | N/C | 12V | 12V |

FIG. 10